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ABSTRACT

This paper reports the results of a study that compared the strategies used by three different groups of upper secondary school students to regulate their own learning processes: 248 Australian students, 215 Japanese students at Japanese schools, and 30 Japanese students at Australian schools. The ways in which strategies are categorized were found to be important in making comparisons between the groups. Although students used a similar range of strategies across the three groups, the pattern of use for each cultural group varied. Variations in the pattern of strategy use were also associated with level of academic achievement. The structuring of the physical environment for study purposes and the checking of one's work were two of the most important strategies for each of the groups. The Japanese students used memorizing strategies significantly more than did the Australian students. Furthermore, although Japanese students now studying in Australia showed a greater similarity with their Australian counterparts on many of the strategies, they still attached significantly greater importance to the use of memorization. This finding is discussed in the light of a Confucian interpretation of the relationship between memorization and understanding. Two tables present study findings. An appendix summarizes the strategy categories. (Contains 56 references.) (Author/SLD)

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Strategies For Self-Regulated Learning: A Cross-Cultural Comparison

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Strategies for Self-Regulated Learning: A Cross-Cultural Comparison

Abstract

This paper reports the results of a study which compared the strategies used by three different groups of upper secondary school students to regulate their own learning processes: Australian students; Japanese students at school in Japan; and Japanese students who are currently studying in Australian schools. The way in which strategies are categorized was found to be important in making comparisons between the groups. Although students used a similar range of strategies across the three groups, the pattern of use for each cultural group varied. Variations in the pattern of strategy use were also associated with level of academic achievement. The structuring of the physical environment for study purposes and the checking of one's work were two of the most important strategies for each of the groups. The Japanese students used memorizing strategies significantly more than did the Australian students. Furthermore, although Japanese students now studying in Australia showed a greater similarity with their Australian counterparts on many of the strategies, they still attached significantly greater importance to the use of memorization. This finding is discussed in the light of a Confucian interpretation of the relationship between memorization and understanding.

Introduction

The importance to academic achievement of self-regulation in learning has been well established within Western contexts. With an increasing number of overseas students choosing to study in Australia, it is important to explore the applicability of Western models of learning to students from different cultures.

The study of students' self-regulatory learning processes relates to how individuals regulate their own behaviors in a variety of contexts and for a variety of reasons. Differences in emphasis and interpretation of the various components of self-regulation have given rise to several distinct lines of research, which, though converging at times, nevertheless maintain their own particular foci. The study reported here is concerned with students' self-regulated learning and is set specifically within a social cognitive perspective of learning.

The distinguishing characteristics of the self-regulation construct are not always clearly identifiable, and interpretations vary according to the particular theoretical position adopted. The following list of terms is almost certainly not exhaustive, but could be gained fairly easily by most readers attempting an initial investigation of the self-regulation literature:

> self-regulation, self-control, self-direction, voluntary action, self-discipline, intentional action, volition, agency, self-determination, purposiveness, self-organization, autonomy, independence, self-management, self-sufficiency, self-change, willpower, self-guidance.

Despite the ready availability of descriptive terminology, the construct of self-regulation has, nevertheless, defied an easy and agreed upon interpretation by researchers (Zimmerman, 1994). Karoly (1982) identifies "commitment, intentionality, and the behavioral enactment of internalized goals" as the key elements of the construct. He defines self-regulation as "those processes, internal and/or transactional, that enable an individual to guide his/her goal directed activities over time and across changing circumstances (contexts)" (Karoly, 1993, p. 25). Self-regulation implies an element of choice, and the self-initiation of action (Zimmerman 1994). Other features often associated with the concept are the delay of reinforcement (Logue, 1988); the acceptance of increased costs (Eisenberger, 1992); acceptance of a small, early punishment over a large, late punishment (Rachlin, 1989); the relative absence of external constraints (Tomarken & Kirschenbaum, 1982); and awareness of socially approved behaviors (Kopp, 1982). This latter aspect, however, does not fit with the notion that self-regulated behavior is inextricably linked to the goals that individuals set for themselves. Not all goals that people set and assiduously pursue are socially desirable, as has been demonstrated in the work of Carroll (in press) on goal setting and juvenile delinquency.

Differences in the relative importance accorded to the influence of external or environmental influences on an individual's capacity to be behaviourally self-regulating are

evident in the various interpretations of the construct of self-regulation. Early theories of learning and behavior revolved around the idea of "other" regulation. Individuals did not so much choose to follow a course of action, but rather they were guided (consciously or unconsciously, willingly or unwillingly) down a particular path by stimuli that were designed by others to elicit desired responses. Behavior was shaped by others, this especially being the case where behavioral dysfunction was diagnosed. The notion of other regulation assumed a different interpretation through the works of Vygotsky (1965) and Feuerstein (Feuerstein, Rand, Hoffman, Hoffman & Miller, 1979) who emphasized the role of adults in influencing the cognitive development of children. From a Vygotskian perspective, it was argued that other-regulation is directly, or indirectly, the very source of internal self-regulation (Wertsch & Stone, 1985). It is through the repeated use of behaviors that have been initially modeled by others (adults), and the internalization of language scripts (self-talk) that children adopt particular sets of behaviors. The educational programs of Feuerstein were initially developed to cater for the learning needs of culturally and economically deprived adolescents who were failing at school. Central to his programs was the notion that, through individual discussions with the teacher, the student is guided towards becoming an active partner in the setting of educational goals.

A model using concepts of primary and secondary control has been used to explain differences between the Japanese and Americans in terms of personal control (Weisz, Rothbaum & Blackburn, 1984). In primary control, individuals are seen to enhance their rewards by influencing existing realities (e.g. other people, circumstances, symptoms, or behavior problems). In secondary control, however, individuals enhance their rewards by accommodating to existing realities and maximizing satisfaction or goodness of fit with things as they are. There is, thus, a gain in control over the psychological impact of events. Weisz et al. suggest that in Japan, secondary control has assumed a more central role in everyday life than it does for Americans. Effort, commitment, and perseverance are behaviors that have traditionally been highly valued in Japanese society so that when these behaviors are demonstrated by an individual they are done so as a form of adaptation to the environment rather than as a demonstration of exerting primary control.

Beginning in the early 1960's, social learning researchers began to interpret the process of self-control as a socialization process (Bandura & Walters, 1963) rather than as a feat of willpower or as a process incorporating behaviorist, stimulus-response techniques. Self-control was viewed as the product of socialization processes aimed at the development of moral standards of conduct. This theory was later extended to include a goal-related aspect. A person's goals and expectations were seen to provide the motivational stimulus to the self-control of behavior that is directed at effecting changes in self or situation.

Self-control research, within the framework of social cognition, initially focused on gaining an understanding of several key aspects of the process: self-control failure (Walters

& Denkow, 1963); the development of standards, and the use of self-rewards (Bandura & Kupers, 1964); the delay of gratification (Bandura & Mischel, 1965); and generalization of patterns of self-control from one situation to another (Bandura, 1969). As well as studying the processes of self-regulation, researchers also investigated a range of modeling techniques designed to assist students to become self-regulators in a variety of situations. Bandura's early self-regulation research and development of theory emphasized the importance of modeling and vicarious experience (e.g., Bandura, 1971; Bandura et al., 1969).

Social cognitive theory (Bandura, 1977; 1986) proposes that personal, contextual, and behavioral factors interact in such a way as to allow opportunity for the exercise of control over one's own destiny, while at the same time setting limits to self-direction. In this model, personal, contextual, and behavioral influences are neither equal in their strength of influence nor simultaneous in their occurrence. It is this second feature in particular that makes it possible to investigate various of the subsystems of the entire interactive process. To attempt to understand and explain the entire process at any one time is an unrealistic task, but "clarifying how the various subsystems function interactively advances understanding of how the superordinate system operates" (Bandura, 1986, p.25).

Self-regulation is recognized to be distinct from "intelligence". Nevertheless, certain of the self-regulatory sub-processes or strategies involve behaviors that are related to several basic capabilities such as the capacity to use symbols, the capacity to learn vicariously (Bandura, 1986), delayed gratification (Patterson & Mischel, 1975), emotional intelligence (Salovey & Mayer, 1990), the ability to visualize (Cross & Markus, 1990) and attention and memory.

A major context for the study of self-regulated behavior is that of academic learning. A social cognitive perspective on self-regulated learning perceives students to be self-regulated learners to the extent that they are "metacognitively, motivationally and behaviorally active participants in their own learning processes" (Zimmerman, 1986). Corno (1987) characterizes self-regulated learners as enactive self-starters who are able to sustain self-motivation and who seem to make learning easier for themselves. In terms of motivational processes, self-regulated learners report high self-efficacy, self-attributions, and intrinsic task interest (Zimmerman, 1990).

A four stage model of self-regulated behavior proposes that to be fully self-regulatory, individuals move through successive steps of observation, imitation, self-control, and self-regulation (Zimmerman & Bonner, in press). The difference between the final two stages is that the former implies the internalization of social mores to the extent that they will guide "attentiveness, execution, persistence, and the monitoring of strategic responses", whereas the latter involves the adaptive use of strategies to suit personal goals and the contexts in which they are to be pursued. The process of self-control is still dependent on a comparison with a standard set by an external model Even though the original model may not be present,

individuals may refer covertly to the performance of the model. Self-verbalization is often employed to guide personal persistence and strategy sequence.

Attempts to measure what students do when they learn have been many and varied (e.g., Biggs, 1987; Brown, Bransford, Ferrara, & Campione, 1983; Derry & Murphy, 1986; Garner, 1990; Kirschenbaum & Perri, 1982; McCombs, 1984; Pintrich & de Groot, 1990, Relich, Debus, & Walker, 1986). The approach used in this study was based on that developed by Zimmerman and Martinez-Pons (1986) in which a structured interview was used to assess students' use of fourteen self-regulated learning strategies. Strategy classification was based on research into the behavior of students described as self-regulating in relation to academic learning (e.g., Bandura & Schunk, 1981; Corno & Mandinach, 1983; McCombs, 1984; Spates & Kanfer, 1977; Wang, 1983). The fourteen self-regulated learning strategies were: self-evaluation, organization and transformation, goal setting and planning, information seeking, record keeping, self-monitoring, environmental structuring, giving self-consequences, rehearsing and memorizing, seeking social assistance (from peers, teachers, or other adults), and reviewing (notes, books, or tests).

This study examined whether a modified form of the procedures developed for categorizing and comparing the use of self-regulated learning strategies of groups of students (Zimmerman & Martinez-Pons, 1986) could be used to compare the strategy use of groups of students whose educational experiences were culturally diverse. It was predicted that the pattern of strategy use demonstrated by the three groups of students in this study (Australian, Japanese, and Japanese/Australian) would not be the same. In addition to cultural group differences, it was expected that achievement level would be associated with a different pattern of strategy use for each of the groups. A further issue of interest was the identification of changes in the pattern of strategy use by Japanese students after exposure to a Western educational system. It was predicted that their pattern of strategy use would indicate a movement away from their peers in Japanese schools and towards the pattern of use exhibited by the Australian students, thereby demonstrating the influence of educational context on how students set about their learning.

Method

Participants

Participants in this study were upper secondary school students in Australia or Japan. Three groups of students were identified: Australian students; Japanese students; and Japanese/Australian students.

The Australian students (n = 248) were intact classes from five schools in the Perth metropolitan area, selected to represent a range of school "types" (government and private, single-sex and co-educational), and a range of abilities. There were 122 males and 126 female and the average age of the students was 17.8 years. This was slightly higher than

normally expected for such a group of students, but is explained by the presence of a small group of mature age students at one of the schools. The Japanese participants (n = 215) were a similar cohort of students from five senior high schools (Years 10 - 12) in the Tokyo, Kanagawa, and Shizuoka districts. Japanese senior high schools are hierarchically ranked according to the academic performance of their students, this ranking being derived from the number of students who are successful in gaining entrance to the University of Tokyo or several other prestigious universities. To ensure a range of achievement levels, schools ranked as Levels A, B, and C (high, medium, and low) were included in the study. The total group of Japanese students consisted of 98 males and 117 females, and their average age was 16.5 years. The Japanese/Australian group of students (n=30) had come from Japan in recent years to study in Australia either because of parental employment commitments, or because there was a perceived advantage in gaining a Western style education. Students from this group attended a number of different schools in the Perth metropolitan area which were also representative of the full range of school types - government, private, single-sex, and co-educational. The amount of time that these students had spent in Australian schools ranged from 9 months to 6 years, with the average time of attendance being 2 years and 9 months. There were 10 males and 20 females, and their average age was 18.4 years.

Instrumentation

The Self-Regulated Learning Interview Schedule (SRLIS) (Zimmerman & Martinez-Pons, 1986; 1988; 1990) was used as the basis for the construction of a written survey of students' learning strategies. In the survey, students were presented with a number of different vignettes in which a range of typical learning contexts were described (e.g., in class, at home, preparing for tests, when poorly motivated). Students were asked to indicate the strategies they would use to assist learning in such situations. Fourteen categories of self-regulated learning strategies were originally identified by Zimmerman and Martinez-Pons: (1) "self-evaluation"; (2) "organizing and transforming"; (3) "goal setting and planning"; (4) "seeking information"; (5) "keeping records and monitoring"; (6) "environmental structuring"; (7) "self-consequences"; (8) "rehearsing and memorizing"; "seeking peer, teacher or adult assistance (9-11)"; and "reviewing tests, notes, and texts" (13-15). A fifteenth category ("other") was used to record non-self-regulated behavior. As well as indicating the choice of strategies for particular contexts, students were asked to estimate the frequency with which they would use these strategies in similar situations (based on a 4-point scale from 1 = seldom to 4 = most of the time).

Although the structured interview procedure has certain advantages over procedures requiring students to respond to open ended questions in written format (e.g., the interviewer can probe students who may be shy or less articulate), it was not possible, in this instance, to interview the Australian and Japanese groups of students. Instead, English and Japanese

written versions of the interview schedule were constructed (in this study, called the *Student Learning Survey*). The group of Japanese/Australian students were, however, interviewed. This was done to ensure that any lack of proficiency in English language skills did not lead to difficulty in interpreting and expressing responses to the vignettes.

For the purpose of this study, several minor modifications to the vignettes were made in order to ensure that the learning contexts described to students were equally valid for both Australian and Japanese students. The back translation method (Brislin, 1986) was used in order to ensure cross-cultural conceptual equivalence of the instrument. Both the English and Japanese versions of the survey were tested on a small group of students prior to administration within the selected schools.

Achievement groups

To enable analysis of data according to academic achievement level, students were assigned to one of three levels of achievement (low, medium, or high). For the Japanese students, those in Level A schools were classified as high-achievers, those in Level B schools were medium-achievers, and those in the Level C school were low-achievers. Classification of the Australian students was achieved by way of self-reported achievement information gathered at the time of administration of the *Student Learning Survey*. No achievement information was available for the Japanese/Australian group; these students, therefore, were not included in the analysis which considered the interaction between strategy use, group, and achievement.

Procedure

The *Student Learning Survey* was administered to intact classes (by the researcher to students in Australian schools, and by a colleague from Aoyama University to students in Japanese schools). The interviews with the Japanese/Australians were conducted by the researcher, and recorded verbatim for subsequent checking. The research project had previously been explained to school principals and to teachers. Students were informed, both verbally and in written form, that they were participating in a survey about the way students learn. There was no time limit for completion of the survey, although the one hour time period that had been allocated by each of the schools provided ample time for all participants. Considerably less time was required for the interviews, generally between twenty and thirty minutes.

Responses from the Japanese students were translated into English by the same native speaker of Japanese who had initially translated the *Student Learning Survey* from English to Japanese. The researcher worked closely with the translator to ensure that the meaning of each of the answers given by students to the vignettes was quite clear.

Results

Coding and classification of students' responses

Students' responses to the eight learning vignettes were initially classified into the fourteen categories of self-regulated learning strategy used in the Zimmerman and Martinez-Pons set of studies (the category "other" was used when nonstrategic behaviors were mentioned by students). Although responses were generally identifiable as belonging to one of these categories, there appeared, nevertheless, to be clear differences *within* several of the categories that suggested the need for further differentiation of the learning behaviors described by the students. Strategy classifications which were subcategorized are "self-evaluation", "organizing and transforming", "environmental structuring", "rehearsing and memorizing", "environmental structuring", and the non-strategic category "other". In all, twenty-four strategies were identified. The following sections provide details of those strategies that were subcategorized, while Appendix 1 presents a summary of the full set of strategy classifications.

Subcategories

Self-evaluation

Several different behaviors were used by students in the execution of the strategy of self-evaluation, which was described by Zimmerman and Martinez-Pons (1986) as "Statements indicating student-initiated evaluations of the quality of progress of their work". Sometimes students actively engaged in activities such as reworking a problem, rereading completed work to check for errors, or self -reflection (e.g., "I redo the problem to see if I get the same answer", "I check over my work to make sure I did it right", "I reflect on my conduct and try and work out why my work was not finished on time").

These types of behaviors were seen to be different from a second form of self-evaluation in which students said they deliberately solicited help from other people in the checking of completed work. In this instance, the student turned to an external source for verification (e.g. "I ask my mother to check my homework", "I look up the answers in the back of the text book", "I compare my work with my friend's"). This latter strategy is not the same as that of seeking social assistance, which is more concerned with asking for help with work that is not understood.

A third subcategory of self-evaluation was suggested by statements in which students indicated that they engaged in some form of procedure in order to test the extent of their knowledge or their ability to perform a task (e.g. "I ask my mother to test me to see if I know it", "I make up a quiz about the topic").

Organizing and transforming

Statements indicating student initiated overt or covert rearrangement of instructional materials to improve learning constituted the generic form of this strategy. However, students indicated that they dealt with the organization and transformation of learning material in several different ways. Most commonly, students said they selected important information from instructional material and wrote it down either verbatim or in their own words. Typically, students mentioned such behaviors as summarizing, listing important points, or making notes while reading (e.g., "I summarize the important points from my text book").

Related to this, but not requiring students to write out summarized information, was the strategy of marking important points in written text, usually by underlining or highlighting. (e.g., "I use a highlighter to mark the important sections in the book.", "I turn down the corner of the important pages".

An organization strategy requiring students to be more active in the organization of learning content was that in which not only was content selected but it was transformed or integrated in a way that was appropriate to the designated task. The writing of outlines or the drafting of essays were behaviors classified in this category (e.g., "I make an outline before I write a paper").

Some students were concerned with the more surface aspects of organization in their work. Rather than dealing with the actual content of learning, they organized their learning materials, and the presentation of their work (e.g., " I put all my notes in order in my file so I can see clearly what I have to learn for this topic", " I make a good copy of my essay before I hand it in").

Environmental structuring

This strategy was originally described as "statements indicating student-initiated efforts to organize the learning context in ways that help them to learn better" (Zimmerman & Pons, 1986). Students' descriptions of what they did to structure their learning environments were of two types - structuring of the physical environment, or structuring of a personal or emotional environment. The former strategy involved the deliberate selection of a place in which to work or the arrangement of the physical setting to make learning easier (e.g., "I isolate myself from anything that distracts me", " I turn off the radio so I can concentrate on what I'm doing").

In the second type of environmental structuring, students spoke of performing a particular personal behavior so that learning was improved. These behaviors often appeared to be directed at creating the right mood, feeling, or attitude for study (e.g., "I have a shower before starting my homework", "When I get tired, I take a break for a while").

Rehearsing or memorizing

Student-initiated efforts to memorize material by overt or covert practice were categorized as rehearsing and memorizing in the Zimmerman and Martinez-Pons studies. In this study, students distinguished between two methods for memorizing instructional material. The first method involved the use of repetition, either in the form of recitation (e.g., I recite the words over and over in my mind), or in the form of repeated writing (e.g., "In preparing for a math test, I keep writing the formula down until I remember it").

A somewhat more sophisticated form of rehearsal, suggestive of an intention to understand as well as commit to memory, was indicated in responses in which students spoke of doing practice exercises to improve skill development or understanding (e.g., "I do lots of similar practice examples so that I really get to understand how to do them").

Nonstrategic behaviors

Three types of nonstrategic behavior ("other), were originally identified: unscorable responses, statements indicating that learning behavior was initiated by another person (such as a teacher), and willpower statements. For this study, three subcategories of nonstrategic "other" were identified: (a) willpower statements in which students indicated a resolve to persist with a task or to use some source of "inner energy" (e.g., "I just force myself to study", "I persist until I can solve all of the problems"); (b) cheating behaviors, as indicated in statements showing a complete reliance on the work of others in order to finish a task (e.g., "I copy my friend's work", "I copy the answers from the answer book"); and (c) responses that were vague, unscorable, or reactive. This third subcategory included all statements that could not be clearly categorized as any of the other strategies, either because they were not specific enough or because the student's intention was unclear (e.g., "I write down everything", "I do my best"), or statements indicating learning behavior that was initiated by other persons such as teachers or parents (e.g. "I do what the teacher tells me").

Interrater reliability

All *Student Learning Surveys* were coded by the researcher. In the initial stages of the coding procedure, a team of six other post-graduate students and senior academics coded approximately 10% of the surveys on two separate occasions. After each of the codings, discussions with the coders led to the refinement of the descriptive criteria for each of the strategies. These criteria were then presented to another person (the Japanese translator of The Student Learning survey), who used them to conduct a final reliability check of the coding procedures. Using Cohen's Kappa (which corrects for chance agreement) as an index of interrater reliability, high agreement was found for the coding of the strategies ($k = .82$).

Substantive results

The score used for all analyses was a measure of *strategy importance* (SI). Each time a student mentioned a strategy, they were asked to estimate the frequency with which they would use such a strategy in similar situations (1 = Seldom , 2 = Occasionally, 3 = Frequently, and 4 = Most of the time). By summing the weighted responses for each strategy and dividing it by the number of times it was mentioned, a measure of the average or typical importance a student attached to the use of each strategy could be derived. Thus, for example, if a student mentioned the strategy of goal setting and planning three times, weighting each mention as "most of the time" (4), "occasionally" (2), and "most of the time" (4), the average importance of that strategy for the student would be (4+2+4)/3.

Homogeneity of Australian group of students

Given the ethnic diversity that exists in Australian classrooms, it was necessary to establish the homogeneity of the Australian group of students in terms of its strategy use so that a valid comparison could be made between it and the other two groups of students. The Australian group of students was divided into ethnic subgroups according to their national origins, and whether or not they had attended school for more than one year in their country of origin. This division resulted in three subgroups: Australian (n = 178); Asian (n = 41); and non-Australian, non-Asian (n = 29).

A multivariate analysis of variance (MANOVA) was used to compare the three subgroups of Australian students on the twenty-four SI measures. Multivariate tests of significance (based on Wilk's lambda criterion) produced a nonsignificant result [F (48, 444) = 1.38, $p > .05$] thereby indicating that the three groups were sufficiently similar in terms of their strategy use to be treated as one larger group of Australian students.

Comparison between the Australian, Japanese/Australian, and Japanese groups of students

Means and standard deviations for the three groups of students on the twenty four categories of strategies are presented in Table 1. Although the last three categories do not represent self-regulated learning strategies, they were, nevertheless, included in the data analysis in order to permit comment at a later stage.

An examination of the absolute values of the means in Table 1 shows the relative average importance of each of the strategies for the three groups. Two of the three most important strategies for each of the three groups were identical - "self-checking" and "environmental structuring (physical)". For the Australian students, the other most important strategy was "goal-setting and planning"; for the Japanese students, it was "memorizing"; and for the Japanese/Australian students, "reviewing notes".

"Self-testing", "highlighting and underlining", and "organizing note and files" were amongst the least important of the strategies for the three groups. Other strategies with low scores on importance were "reviewing tests and other work" for the Australian and Japanese students, and "outlining and drafting", "keeping records", "using self-consequences", and "seeking adult assistance" for the Japanese students.

Table 1

The multivariate analysis of variance (MANOVA) used to compare the three groups (Australian, Japanese in Australia, and Japanese) on the twenty-four SI measures produced a significant result [E (48, 934) = 16.65, $p < .001$]. The univariate F-tests obtained from a one-way analysis of variance (shown in the last two columns of Table 1) reveal significant differences ($\alpha = .01$) between the three groups on sixteen of the twenty-four strategies.

To determine which group means differed significantly from one another, Scheffé tests ($\alpha = .01$) were used. The Australian and the Japanese groups of students differed significantly on thirteen of the strategies, with most of those differences being attributed to the higher scores of the Australians. These students reported significantly greater use of "other checking", "self-testing", "outlining and drafting", "organizing notes and files", "goal-setting and planning", "keeping records", "using self-consequences", "seeking teacher assistance", "reviewing notes", and "reviewing tests and other completed work". The Japanese students, on the other hand, obtained significantly higher strategy scores for "memorizing" and "reviewing textbooks", and for the non-strategic behavior "cheating".

When the Japanese/Australian students were compared with both of the other groups, they were found to be more similar to the Australian students in their use of strategies. Four significant differences were found between these two groups. The Japanese/Australians had significantly lower scores than the Australians for "environmental structuring (self)", "seeking teacher assistance", and "other", but a significantly higher score for "memorizing". On the other hand, comparisons between the Japanese/Australians and the Japanese students revealed nine significant differences. The Japanese/ Australian students reported significantly greater use of "other checking", "outlining and drafting", "keeping records", "reviewing notes", "reviewing tests and other completed work", and "using willpower". The Japanese were significantly higher on scores for "reviewing textbooks", "cheating", and "other".

No significant differences were found between any of the groups for "self-checking", "summarizing and notetaking", "highlighting and underlining", "seeking information",

"environmental structuring (physical)", "doing practice exercises", "seeking peer assistance", and "seeking adult assistance".

Achievement levels

Achievement scores were not available for the Japanese/Australian students. It was, therefore, necessary to perform another MANOVA using a 2 (Australian and Japanese) x 3 (high, medium, and low-achievers) design in order to examine whether strategy use varied not only as a function of the cultural group to which a student belonged but also as a function of achievement level. With the use of Wilk's lambda criterion, it was shown that the dependent variables were significantly affected by both group [$\underline{F}$ (24, 434) = 27.53 $p < .001$], by achievement [$\underline{F}$ (48, 868) = 2.19, $p < .001$], and by their interaction [$\underline{F}$ (48, 868) = 1.81, $p = .001$].

An examination of the means in Table 2 reveals a general tendency for the high-achievers in both groups to obtain higher strategy scores than the low-achievers. Several exceptions to this are worthy of note: for the Australian students, the high-achievers were less inclined to use the strategy of "seeking adult assistance"; the high-achieving Japanese students had lower scores for "other-checking", "seeking teacher assistance", and for the non-strategic action of "using willpower".

The main results of interest in this analysis were the interactions between group and achievement for the twenty-four strategies. Significant interactions ($\alpha = .01$) were found for only two of the strategies - "other checking" [$F(2, 457) = 9.41$, $p < .001$], and "doing practice exercises" [$F(2, 457) = 5.41$, $p < .01$]. For the Australian students, the higher the achievement level, the more likely they were to use the strategy of "other checking" whereas for the Japanese students, the reverse was found to be the case. For "doing practice exercises", the higher the achievement level of the Australian students, the higher the strategy score. For the Japanese students, however, scores across the three achievement levels for this strategy were much more uniform.

Table 2

15 strategies

It will be recalled that although the coding procedure developed by Zimmerman and Martinez-Pons (1986) formed the basis for the categorization of responses to the Student Learning Survey, four of those strategies (as well as non-strategic "other") were subcategorized in this study to provide a more detailed comparison. To test the notion that differences between the three groups of students would have been masked by limiting the

analysis to the set of fifteen, rather than twenty-four categories, strategies one to three were collapsed to form a single strategy "self-evaluation", strategies four to seven became "organizing and transforming", strategies eleven and twelve became "environmental structuring", strategies fourteen and fifteen became "rehearsing and memorizing", and strategies twenty-two to twenty-four became the single non-strategic category of "other".

A MANOVA was performed on the set of fifteen strategies thus formed, producing a significant multivariate effect, $E\ (30, 952) = 18.05$, $p < .001$. Only the five newly formed strategies were examined for differences between the groups (the others, of course, producing similar results to those found in the first MANOVA). Univariate F-tests indicated that, whereas significant differences were found between the groups for each of the three sub-categories of "self-evaluation" in the first analysis, these disappeared when they were grouped together [$E\ (2, 490) = 0.24$, $p > .01$]. Similarly, the groups were not significantly different in their use of the combined strategy of "organizing and transforming" [$E\ (2, 490) = 2.40$, $p > .01$], whereas they had displayed significant differences for two of the four sub-categories of this strategy. Differences between groups on "environmental structuring" were not significant when the two sub-categories were combined [$E\ (2, 490) = 3.19$, $p < .01$] but when analyzed separately, a significant difference was found for "environmental structuring (self)". On the other hand, the single strategy "rehearsing and memorizing" was shown to produce significant results in the second analysis [$E\ (2, 490) = 39.95$, $p < .001$], although groups were found to differ significantly on only the "memorizing" sub-category in the first analysis. Significant differences were found for the combined "other" [$E\ (2, 490) = 14.15$, $p < .001$], as well as for the three sub-categories of this strategy. These results suggest that there are justifiable grounds for the subcategorisation procedure used in this study in all instances except that applying to the non-strategic category "other".

Conclusions

When asked what strategies assisted them to learn in a range of different learning contexts, each of the three groups of students in this study mentioned the same set of strategies of self-regulated learning as those that have been previously identified (Zimmerman & Martinez-Pons, 1986; 1988; 1990). This finding is good evidence of the validity of this approach for assessing strategy use across cultures. As well as a general cross-cultural similarity in terms of the types of strategies used, two of the three most used strategies ("environmental structuring (physical)" and the evaluation strategy of "self-checking") were found to be the same for each of the groups.

The apparent emphasis placed on the checking of one's work is contrary to the finding of Zimmerman and Martinez-Pons (1988) who reported that self-evaluation was one of the

three *least* used by students in their study. Whether this reflects an actual difference in strategy use or a difference in the coding of students' responses is unclear. For this study, self-checking was taken to be any behavior that indicated that the student's prime motivation was to gauge the quality of their work, their understanding, or their efforts in relation to the task demands. Such behaviors typically included: checking, revising, or redoing work; or using different methods to solve a problem to see if the answers were the same.

Despite the similarity in the *range* of strategies used by the three groups, however, there were significant differences in their *pattern* of strategy use. Of the differences that were noted, that relating to the use of memorization is of particular interest. It was the strategy rated by the Japanese students as being the most important in their learning. Furthermore, its importance as a learning behavior was maintained by the Japanese students even after experiencing the Australian classroom learning context in which memorization is not encouraged as a strategy for learning. On the surface, this would seem to give support to a stereotypical view of the Japanese student as a rote learner. Moreover, in agreement with the findings of Stevenson and Stigler (1992), the emphasis on memorization appears not to be detrimental to academic achievement.

A major criticism of the use of memorization strategies is that their use leads only to low level learning outcomes. It is often assumed that committing information to memory militates against the understanding of content and that other higher level processes will not be used. However, much of the criticism of the use of rehearsal and memorization in learning seems not so much to be directed at the strategy itself but at the model of learning that it is thought to represent - a quantitative one. In this model, learning is seen to be related to the amount of information processed by the learner (Bromage & Mayer, 1986). The focus is on how much is learned. An alternative model is one in which the focus is not on quantity of learning, but quality of learning. Hence, if the learner processes information in one way, the result will be one kind of learning outcome; if it is processed in another way, then a different kind of outcome will be the result. For instance, Bromage and Mayer suggests that a learner could rehearse by trying to find causal links between the various ideas presented in a textbook, or by trying to rehearse a verbatim definition.

Although the kinds of mental operations that accompanied students' reported use of strategies were not assessed in this study, many of the Japanese students indicated that they were not merely rehearsing and memorizing information in order to add it to a store. Invariably, there was mention of a reason for memorizing material: "I repeat the information over and over so that I can understand it". Such statements are entirely in accord with the traditional Japanese view that repetition is *a route to understanding* (Hess & Azuma, 1991). Students are encouraged to learn from the Confucian wisdom which recommends "Read it one hundred times, and understanding will follow spontaneously", and "Seeing knowledge without thinking is labor lost; thinking without seeing knowledge is perilous".

The use of memorization procedures does not imply an indiscriminate selection of the material to be rehearsed and memorized (Nolen, 1988). In this study, when the Japanese students indicated that they used strategies of memorization and rehearsal, it is highly likely that they were making judicious choices about what it was that needed to be learned. The act of choosing one set of content over another can be seen as a strategic action requiring task definition, and awareness of one's own strengths and weaknesses in terms of content knowledge.

Apart from memorization, other significant differences between the groups were also found in terms of their pattern of strategy use. Some of these differences, however, were not evident when strategy categories were limited to the set of fourteen used in the previous studies. For several of the strategy categories, students' responses suggested that they were actually instituting the strategy in different ways. In order to tease out some of the differences, it was necessary to subcategorize and provide more explicit descriptions of several of the strategies. That way, it was possible to isolate more precisely differences in the learning behaviors of students across the three groups. Results from a comparison of analyses performed with both the expanded set of strategies and the set originally proposed by Zimmerman and Martinez-Pons show clearly the difficulties associated with measuring differences in categorical data when the categories are dependent on a set of descriptions. This difficulty has already been addressed in part as evidenced by the differentiation in previous research (Zimmerman & Martinez-Pons, 1986; 1988; 1990) between several social assistance strategies (peer, teacher, and adult), and between different strategies for reviewing (tests, notes, and texts). In this study, the broader categories of "self-evaluation", "organizing and transforming", "environmental structuring", and "rehearsing and memorizing" were shown also to be practiced by students in different ways.

In keeping with other findings (e.g., Zimmerman & Martinez-Pons, 1986; 1990), the higher-achieving students from each of the three groups tended to obtain higher scores on most of the strategies than did the lower-achievers. The relationship between strategy use and achievement has been explained in several different ways. Brown and her colleagues (1983) claim that low-achieving students seem often to lack the ability to use learning strategies selectively. This may well be the case. It is also likely that dysfunctional motivational processes act as moderating variables. As Pintrich and de Groot (1990) note, students need the "will" as well as the "skill" in learning if they are to use learning strategies successfully. In social cognitive theory, self-efficacy is seen to influence a person's choice of activity, the amount of effort they apply to the performance of that activity, and their willingness to persevere (Bandura, 1986). In academic settings, previous research has found higher verbal and mathematics efficacy to be related to a greater use of self-regulated learning strategies and higher achievement (Zimmerman & Martinez-Pons, 1990). Although students' academic self-efficacy was not assessed in this study, it is highly probable that self-efficacy,

and not just ability may moderate the relationship between strategy use and academic achievement.

Not all methods that students mentioned as assisting them in learning were considered to represent strategic behaviors. Noticeable amongst the category "other" were several behaviors of particular interest. The first of these, "using willpower", was characterized by statements suggesting effort and persistence on the part of the students, but there was no indication of how this was to be achieved. For the Japanese students, such statements were positively correlated with their combined strategy importance score, thereby suggesting that these students exerted willpower consciously and for a purpose, rather than as a vague self-exhortation to do better.

The use of willpower as a strategic action is congruent with the Japanese cultural emphasis on commitment to task and the ability to persevere. In Japanese schools, structured systems of student guidance (Seito Shido) are highly influential in the fostering of concentration ability, and persistence, and the urging of oneself to "keep going and try harder" may indeed be a strategic action on the part of a Japanese student. The value of self-talk in the regulation of one's own behavior has long been recognized within Western psychology (e.g., Karoly & Kanfer, 1982; Meichenbaum, 1977; Harris, 1990; Vygotsky, 1965). The expression by a Japanese student to "try harder" may have been a self-instruction to do just that - to persist and not give up, to maintain commitment to task - rather than a vague expression serving no strategic purpose.

As well as willpower statements, there was another group of "other" responses that fell clearly into a subcategory of its own - that of "cheating". Previous research has identified several correlates of cheating behavior. A high need for achievement has been found to be associated with increased cheating by children (Johnson, 1981; Mischel & Gilligan, 1964). On the other hand, the reinforcement of high performance was found to reduced cheating amongst college students (Eisenberger, Mitchell & Masterson, 1985; Eisenberger & Shank, 1985). Together, these two findings suggest that in some situations cheating is associated with achievement, but in this study there was no evidence of differences in the cheating behavior of high-, medium-, and low-achievement groups across cultures. That some students saw cheating as a strategic action (recall that they were asked to list the things they did that *helped them learn*) is an interesting phenomenon. Perhaps these students equated learning with achievement, and saw such activities as the copying of a friend's work as one way to achieve a higher mark in instances where their own lack of knowledge or effort would have led to failure.

The data suggest that the Japanese students who are now studying in Australia are in an intermediate stage in terms of their strategy use. Their scores on many of the strategies show a movement away from the pattern of strategy use of the Japanese group towards the pattern exhibited by the Australians. This finding, together with the different patterns of

strategy use of the three groups already discussed, is in agreement with social cognitive theory in which context is an essential dimension of strategic learning (Zimmerman & Bonner, in press). The strategies used in one situation are not necessarily the most appropriate when social and physical contexts change. Situational adjustment of the use of learning strategies, together with personal factors such as the level of one's knowledge and metacognitive awareness, allows students to become self-regulating in learning, thereby optimizing their learning outcomes.

This study provides a number of important findings. First, it has been demonstrated that a more specific categorization process provides clearer understanding of differences in strategy usage between groups. When groups are compared on categories that are too encompassing, some differences are masked. Second, in keeping with social cognitive theory, the importance of context in student learning has been borne out. Although the range of strategies used by three culturally diverse groups was shown to be the same, the pattern of use differed for each group. Third, strategy use is influenced by achievement level, with higher achievers demonstrating a greater use of strategies regardless of cultural group. Fourth, the emphasis on memorization strategies by the Japanese and the Japanese/Australian should be seen in the light of Confucian beliefs about the relationship between memorization and understanding. Finally, although willpower statements were viewed as expressions of nonstrategic behaviors, the Japanese cultural emphasis on persistence in the face of adverse conditions suggests scope for further investigation of this phenomenon.

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Appendix A

Summary of strategy categories

Self-evaluation

Statements indicating student-initiated evaluations of the quality of completed work, understanding of an area of work, or effort in relation to task demands.

Sub-categories:

1. Checking the quality of work or effort
   - * redoing, reworking
   - * rereading
   - * using different methods to solve a problem and seeing if the answer is still the same
   - * visualising previously learned material and comparing the "picture" with the answer or completed work
   - * correcting work, revising, editing
   - * reflecting on work related behavior

   e.g., "I check over my work to make sure I did it right."
   "I reflect on my conduct and try and work out why my work was not finished on time."

2. Using other sources (e.g., people, computers) to check work
   - * comparing with - peers, textbook solutions, answer books, other books
   - * asking others to check completed work

   e.g. "I ask my mother to check my homework."
   "I look up the answers in the back of the text book."
   "I compare my work with my friend's."

3. Testing the extent of knowledge or ability to perform a task
   - * self-testing
   - * constructing quizzes
   - * getting others to ask questions

   e.g. "I ask my mother to test me to see if I know it."

Organizing and transforming

Statements indicating student initiated overt or covert rearrangement of instructional materials to improve learning.

Sub-categories:

4. Summarizing; listing important points; making notes while reading [different from category 5 (keeping records) which is note taking] - e.g., "I summarize the important points from my text book "

5. Writing outlines, drafts; mental planning of a task, similar to drafting
   e.g., "I make an outline before I write a paper."

6. Highlighting, underlining, marking the important parts or main ideas
   e.g., "I turn down the corner of the important pages."
   "I use a highlighter to mark the important sections in the book."

7. Organizing files, notes, etc.; writing neat or final copies of work
   e.g., " I put all my notes in order in my file so I can see clearly what I have to learn for this topic." " I make a good copy of my essay before I hand it in."

8. <u>Goal setting and planning</u>

Statements indicating student setting of educational goals or subgoals and planning for sequencing, timing, and completing activities related to those goals.

   e.g., "I start studying two weeks before exams, and I pace myself."
   "I leave the difficult questions until last and then come back to them."
   "I try and work out what are the most important parts for me to study and spend time on those."

9. <u>Seeking information</u>

Statements indicating student-initiated efforts to secure further task information from non-social sources when undertaking an assignment. This is different from 10c - reviewing textbooks.

   e.g., "Before beginning to do an assignment, I go to the library to get as much information as possible concerning the topic."

10. <u>Keeping records</u>

Statements indicating student-initiated efforts to record events or results.

   e.g., "I take notes of class discussions."
   "I keep a list of the words I get wrong."

<u>Environmental structuring</u>

Statements indicating student-initiated efforts to organize the learning context in ways that help them to learn better.

Sub-categories:

11. Physical environment - select or arrange the physical setting to make learning easier.

    e.g., "I isolate myself from anything that distracts me."

    " I turn off the radio so I can concentrate on what I'm doing."

12. Self-environment - perform a particular personal behavior so that learning is improved.

    e.g., "I have a shower before starting my homework."

    "When I get tired, I take a break for a while."

13. Self-consequences

Statements indicating student arrangement or imagination of rewards or punishment for success or failure

    e.g., "If I do well on a test, I treat myself to a movie."

    "I imagine what my teacher will say if I don't do my homework."

Rehearsing and memorizing

Statements indicating student-initiated efforts to memorize material by overt or covert practice

Subcategories:

14. Memorizing

    e.g., "In preparing for a math test, I keep writing the formula down until I remember it."

15. Doing practice exercises to improve skill development or understanding

    e.g., "I do similar practice examples so that I really get to understand how to do them."

Seeking social assistance

Statements indicating student-initiated efforts to solicit help from other people. This is different from Category 1 where students specifically ask someone to check their work to see if it is correct. Category 9 is less specific; it usually involves asking someone for help when there is something the student doesn't understand.

Subcategories:

16. Peers

    e.g., "If I have a problem with a math assignment, I ask a friend to help."

17. Teachers

    e.g., "I talk to my teacher after the lesson about my assignment."

18. Adults (includes out-of-school tutors and all unidentified people)

    e.g., "I ask members of my family what they think about the topic."

    "My tutor explains the parts I can't understand."

Reviewing records

Statements indicating student-initiated efforts to revise or review relevant work

Sub-categories:

19. Re-viewing notes

e.g., "When preparing for a test, I review my notes."

20. Reviewing tests or other completed work

e.g., "I read the essays that I wrote last term."

21. Reviewing textbooks

e.g., "I read the textbook if there is one."

Non-strategic

Subcategories:

22. Using willpower

Statements indicating a resolve by the student to persist with a task or to use some source of "inner energy".

e.g., "I just force myself to study."

"I persist until I can solve all of the problems."

23. Cheating

Statements indicating complete reliance on the work of others in order to finish a task.

e.g., "I copy my friend's work."

"I copy the answers from the answer book."

24. Other (vague, unscorable, reactive)

Statements that could not be clearly categorized as one of the above, either because they were not specific enough or because the student's intention was unclear;

e.g., "I write down everything."

"I do my best."

or statements indicating learning behavior that is initiated by other persons such as teachers or parents.

e.g. "I just do what the teacher says."

Table 1

Means (and Standard Deviations) and Univariate F-Tests of Strategy Importance Scores for the Three Groups

	Strategy	Strategy Importance (SI) Aust n=248	Jap/Aust n=30	Jap n=215	MS	F
1	Self-check	3.21 (0.89)	3.13 (0.85)	3.03 (1.06)	1.97	2.12
2	Other check	2.10 (1.55)	2.21 (1.62)	1.19 (1.61)	51.20	20.50**
3	Self-test	.96 (1.42)	.80 (1.40)	.21 (0.75)	32.89	23.80**
4	Summarize/note	2.45 (1.53)	2.23 (1.70)	2.23 (1.60)	3.14	1.26
5	Outline/draft	1.48 (1.65)	1.85 (1.84)	.88 (1.44)	26.54	10.74**
6	Highlight/underline	.51 (1.24)	.47 (1.25)	.28 (0.94)	3.18	2.53
7	Organize notes/files	.67 (1.36)	.80 (1.54)	.16 (0.73)	17.21	13.15**
8	Goal-set/plan	2.98 (1.08)	2.41 (1.48)	2.21 (1.67)	34.42	17.79**
9	Seek information	1.48 (1.49)	1.81 (1.56)	1.82 (1.55)	7.22	3.12
10	Keep records	1.92 (1.79)	2.42 (1.57)	.67 (1.36)	105.73	41.17**
11	Physical environment	3.18 (0.99)	2.81 (1.37)	2.96 (1.06)	3.84	3.51
12	Self-environment	2.21 (1.66)	1.13 (1.58)	1.93 (1.69)	16.89	6.10*
13	Use self-consequences	1.83 (1.75)	1.17 (1.72)	.83 (1.47)	57.17	21.38**
14	Memorize	1.36 (1.61)	2.44 (1.62)	3.04 (1.19)	165.05	79.48**
15	Do practice exercises	1.37 (1.60)	2.21 (1.60)	1.46 (1.73)	9.52	3.47
16	Seek peer assistance	2.48 (1.38)	2.13 (1.49)	2.19 (1.51)	6.08	2.92
17	Seek teacher assistance	2.71 (0.97)	1.71 (1.42)	1.03 (1.45)	163.51	108.29**
18	Seek adult assistance	1.27 (1.54)	1.32 (1.64)	.89 (1.42)	8.94	3.98
19	Review notes	2.81 (1.41)	2.89 (1.66)	1.76 (1.74)	68.09	27.37**
20	Review tests/work	.66 (1.37)	1.05 (1.61)	.10 (0.58)	23.96	18.90**
21	Review textbooks	2.12 (1.58)	1.58 (1.60)	2.74 (1.37)	31.63	14.15**
22	Use willpower	1.97 (1.68)	1.12 (1.75)	2.10 (1.53)	12.81	4.86*
23	Cheat	.24 (0.86)	.03 (0.18)	1.16 (1.56)	54.15	37.77**
24	Other	2.60 (1.35)	.74 (1.42)	2.82 (0.98)	56.86	38.9**

df = [2, 490]

**p = <.001, *p = <.01

Table 2

Means (and Standard Deviations) of Strategy Importance Scores for Australian and Japanese Low-, Medium-, and High-Achievers

		Australian			Japanese		
		Low (n = 52)	Med (n = 140)	High (n = 56)	Low (n = 39)	Med (n = 85)	High (n = 91)
1	Self-check	2.97	3.30	3.22	2.72	3.04	3.14
		(1.22)	(0.72)	(0.88)	(0.96)	(1.17)	(0.97)
2	Other check	1.51	2.24	2.28	1.72	1.48	.69
		(1.65)	(1.48)	(1.51)	(1.63)	(1.73)	(1.33)
3	Self-test	.76	1.03	.99	.10	.43	.06
		(1.32)	(1.43)	(1.50)	(0.45)	(1.06)	(0.38)
4	Summarize/note	1.74	2.67	2.58	2.28	2.27	2.16
		(1.56)	(1.43)	(1.55)	(1.58)	(1.52)	(1.68)
5	Outline/draft	1.12	1.51	1.75	1.10	.84	.83
		(1.49)	(1.66)	(1.71)	(1.48)	(1.47)	(1.42)
6	Highlight/underline	.10	.50	.93	.00	.46	.24
		(0.50)	(1.26)	(1.55)	--	(1.18)	(0.86)
7	Organize notes/files	.39	.73	.80	.26	.21	.07
		(0.96)	(1.43)	(1.48)	(0.91)	(0.86)	(0.47)
8	Goal-set/plan	2.70	3.03	3.09	1.99	2.29	2.23
		(1.31)	(0.98)	(1.04)	(1.75)	(1.62)	(1.70)
9	Seek information	1.29	1.63	1.31	1.65	1.77	1.95
		(1.48)	(1.51)	(1.44)	(1.42)	(1.63)	(1.53)
10	Keep records	1.91	1.99	1.74	.87	.72	.54
		(1.60)	(1.84)	(1.84)	(1.53)	(1.36)	(1.29)
11	Physical environment	2.78	3.28	3.30	2.40	3.06	3.11
		(1.33)	(0.78)	(1.02)	(1.05)	(1.07)	(0.97)
12	Self-environment	1.68	2.31	2.44	1.62	1.89	2.10
		(1.75)	(1.57)	(1.69)	(1.64)	(1.66)	(1.73)
13	Use self-consequences	1.20	1.83	2.39	.15	.98	.99
		(1.70)	((1.70)	(1.77)	(0.71)	(1.57)	(1.55)
14	Memorize	.72	1.49	1.61	2.63	3.07	3.19
		(1.30)	(1.62)	(1.71)	(1.31)	(1.16)	(1.13)
15	Do practice exercises	.58	1.38	2.05	1.19	1.69	1.37
		(1.32)	(1.55)	(1.66)	(1.54)	(1.77)	(1.75)

16	Seek peer assistance	2.02	2.50	2.83	2.25	2.11	2.19
		(1.55)	(1.31)	(1.29)	(1.57)	(1.51)	(1.51)
17	Seek teacher assistance	2.65	2.67	2.86	1.03	1.23	.83
		(1.02)	(0.94)	(0.98)	(1.35)	(1.55)	(1.38)
18	Seek adult assistance	1.51	1.21	1.19	.54	.86	1.08
		(1.61)	(1.49)	(1.61)	(1.16)	1.38)	(1.54)
19	Review notes	2.33	2.96	2.87	1.93	1.91	1.54
		(1.60)	(1.29)	(1.43)	(1.57)	(1.73)	(1.81)
20	Review tests/work	.38	.74	.74	.15	.02	.15
		(1.10)	(1.44)	(1.46)	(0.67)	(0.22)	(0.74)
21	Review textbooks	1.65	2.17)	2.45	2.47	3.02	2.59
		(1.48)	(1.57)	(1.62)	(1.42)	(1.15)	(1.51)
22	Use willpower	1.59	2.02	2.21	2.44	2.11	1.95
		(1.66)	(1.67)	(1.72)	(1.21)	(1.58)	(1.60)
23	Cheat	.38	.17	.25	1.39	1.01	1.19
		(1.06)	(0.77)	(0.88)	(1.48)	(1.57)	(1.57)
24	Other	2.72	2.57	2.54	2.84	2.77	2.87
		(1.04)	(1.43)	(1.42)	(0.61)	(1.02)	(1.08)